FLOOR CLEANING IMPLEMENT

TECHNICAL FIELD

[0001] The present invention generally relates to a floor cleaning implement, and more specifically, to a floor cleaning implement having a mop head comprised of a three-dimensional surface, wherein the three-dimensional surface readily receives a planar cleaning sheet, such as a woven or nonwoven, which conforms to the contours of the three-dimensional mop head surface.

Background of the Invention

[0002] Various floor cleaning implements or mops are known in the art, wherein the mops are ultimately differentiated by formation of the mop head. Mops are often comprised of a handle and a support head or mop head that is attached to the handle by a universal joint. Typically, the mop heads are either foam or sponge, wherein the foam or sponge mop head is replaceable. In some instances, the foam or sponge replacements get attached to a metal plate, which provides the foam or sponge with support during the cleaning process. So as to assist with the cleaning process, the foam or sponge mop heads often comprise a raised three-dimensional pattern, as illustrated in U.S. Design Patents D429,859; D447,299; and D451,656, all of which are hereby incorporated by reference.

[0003] More recently, floor cleaning systems have been developed, whereby the body of the mop may or may not contain an aqueous solution that is dispensed onto the surface to be cleaned and a disposable nonwoven sheet or pad mop head acts to absorb the solution, as well as capture and retain particulates in the cleaning process. Further, the nonwoven sheets or pads utilized with the floor cleaning systems are usually imparted with a three-dimensional pattern in order to facilitate the process of picking-up particulates, such as dirt, dust, and hair. Such three-dimensional fabrics are disclosed in U.S. Patent No. 6,502,288, assigned to Black, et al. and U.S. Patent No. 5,674,591 to James, et al., both of which are hereby incorporated by reference.

[0004] Conventionally, it is the actual cleaning surface material, such as the foam, sponge, or nonwoven that comprises the raised three-dimensional pattern or design, while the mop head itself remains relatively flat. Due to the technology involved in

manufacturing such three-dimensional materials, it can be costly to consumers that purchase mop head replacements on a regular basis. The present invention contemplates a mop head comprising a three-dimensional surface, wherein the cleaning material utilized with the mop head is planar, conforming to the raised three-dimensional pattern imparted within the surface of the mop head.

SUMMARY OF THE INVENTION

[0005] The present invention is directed to a floor cleaning implement, and more specifically, to a floor cleaning implement having a mop head comprised of a three-dimensional surface, wherein the three-dimensional surface readily receives a planar cleaning sheet, such as a woven or nonwoven, which conforms to the contours of the three-dimensional mop head surface.

[0006] In accordance with the present invention, the planar cleaning sheet may be either a woven fabric or nonwoven fabric, such as a carded web, spunbond, meltblown, air laid, wet laid, or a combination thereof. Further, the cleaning sheet may be affixed to the mop head by a variety of methods, including, but not limited to pinch points located within the mop head that act to grab and hold the cleaning sheet in place, adhesive means, or hook and loop fasteners.

[0007] In a first embodiment, the floor cleaning implement comprises a handle, an optional support surface, and mop head that is attached to the handle by a universal joint. The mop head comprises a three-dimensional surface, whereby a planar cleaning sheet is affixed, conforming to the surface of the mop head. Further, the mop head of the cleaning implement is interchangeable in order to choose the mop head that best fits the cleaning task at hand, wherein one mop head may be better for floor dusting tasks and a separate mop head may be better for floor scrubbing tasks.

[0008] In a second embodiment, the floor cleaning implement comprises a handle and a support head or mop head that is attached to the handle by a universal joint, wherein the mop head comprises a first side comprised of a first three-dimensional surface and a second side comprised of a second three-dimensional surface. A two-sided mop head can address two separate cleaning tasks, wherein one side may be used to loosen stuck-on particulates and the opposing side may be used to capture and retain the

loosened particulates. It is also contemplated that the mop head may comprise more than a first and second side. For instance, if the mop head were triangular in shape, each side of the mop head may be utilized to designate a different cleaning surface.

[0009] In a third embodiment, the mop head may operate as an universal adapter to a variety of floor cleaning implements, wherein the three-dimensional surface of the mop head may attach to a separate floor cleaning implement comprised of flat support surface. Hereby incorporated by reference, U.S. Patent No. 5,502,858, to Hoagland, et al. demonstrates a mop head comprised of a support surface.

[0010] Other features and advantages of the present invention will become readily apparent from the following detailed description, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 is a diagrammatic view of a floor cleaning implement made in accordance with the present invention;

[0012] Figure 2 is the reverse side of the floor cleaning implement of Figure 1;

[0013] Figure 3 is a diagrammatic view of a floor cleaning implement made in accordance with the present invention;

[0014] Figure 4 is the reverse side of the floor cleaning implement of Figure 3;

[0015] Figure 5 is a diagrammatic view of the prior art;

[0016] Figure 6 is a diagrammatic view of an embodiment of the present invention; and

[0017] Figure 7 is a diagrammatic view of an embodiment of the present invention.

Detailed Description

[0018] While the present invention is susceptible of embodiment in various forms, there is shown in the drawings and will hereinafter be described a presently preferred embodiment of the invention, with the understanding that the present disclosure is to be considered as an exemplification of the invention, and is not intended to limit the invention to the specific embodiment illustrated.

[0019] The present invention is directed to a contoured mop head with a three-dimensional surface that readily receives a planar cleaning sheet that fashions itself to the three-dimensional surface of the mop head. In reference to Figure 1, therein is illustrated a first embodiment. Figure 1 is a diagrammatic representation of a floor cleaning implement with a handle (12) and a mop head (10), wherein the mop head comprises a three-dimensional surface (14). In accordance with the present invention, a planar cleaning sheet is affixed to the mop head (10) by way of pinch points (16), which act to grab the cleaning sheet and prevent shifting during the cleaning process.

[0020] In reference to Figures 3 and 4, therein is illustrated a second embodiment, wherein the mop head comprises a first side and a second side. Figure 3 shows the first three-dimensional surface (14) of a first side of the mop head (10) and Figure 4 shows a second three-dimensional surface (14) of a second side of the opposing side of the mop head (10).

[0021] A third embodiment is illustrated in Figures 5, 6, and 7, wherein Figure 6 shows a diagrammatic representation of the prior art, a typical mop comprising a support surface (18). The three-dimensional adapter surface of Figure 5 is secured to the support surface (18) of Figure 6 so as to convert the mop into one comprising a contoured, three-dimensional surface. The three-dimensional adapter of Figure 5 may be secured to the support surface (18) of Figure 6 by various means, such as clips, clamps or hooks. A planar cleaning sheet may then be secured to the three-dimensional surface of the mop for an improved cleaning surface.

[0022] The cleaning sheet of the present invention may be a woven or nonwoven fabric. Preferably planar, the cleaning sheet of the present invention may be one or more layers, wherein the layers may be selected from the group consisting of spunlace, spunbond, meltblown, air laid, wet laid, films or a combination thereof. Manufacture of the cleaning sheet embodying the principles of the present invention may include providing the fibrous matrix, which can include the use of staple length fibers, continuous filaments, and the blends of fibers and/or filaments having the same or different composition. Fibers and/or filaments are selected from natural or synthetic composition, of homogeneous or mixed fiber length. Suitable natural fibers include, but

are not limited to, cotton, wood pulp and viscose rayon. Synthetic fibers, which may be blended in whole or part, include thermoplastic and thermoset polymers. Thermoplastic polymers suitable for blending with dispersant thermoplastic resins include polyolefins, polyamides and polyesters. The thermoplastic polymers may be further selected from homopolymers; copolymers, conjugates and other derivatives including those thermoplastic polymers having incorporated melt additives or surface-active agents. Staple lengths are selected in the range of 0.25 inch to 10 inches, the range of 1 to 3 inches being preferred and the fiber denier selected in the range of 1 to 22, the range of 1 to 8 denier being preferred for general applications. The profile of the fiber and/or filament is not a limitation to the applicability of the present invention.

[0023] Spunlace fabrics, otherwise known as hydroentangled fabrics, are known in the art and disclosed in U.S. Patent No. 3,485,706, to Evans, hereby incorporated by reference. The hydroentanglement of fibers or filaments of the fabric acts to provide the fabric with a useful level of integrity. Subsequent to entanglement, fabric integrity can be further enhanced by the application of binder compositions and/or by thermal stabilization of the entangled fibers or filaments.

[0024] A spunbond process involves supplying a molten polymer, which is then extruded under pressure through a large number of orifices in a plate known as a spinneret or die. The resulting continuous filaments are quenched and drawn by any of a number of methods, such as slot draw systems, attenuator guns, or Godet rolls. The continuous filaments are collected as a loose web upon a moving foraminous surface, such as a wire mesh conveyor belt. When more than one spinneret is used in line for the purpose of forming a multi-layered fabric, the subsequent webs is collected upon the uppermost surface of the previously formed web. The web is then at least temporarily consolidated, usually by means involving heat and pressure, such as by thermal point bonding. Using this means, the web or layers of webs are passed between two hot metal rolls, one of which has an embossed pattern to impart and achieve the desired degree of point bonding, usually on the order of 10 to 40 percent of the overall surface area being so bonded.

[0025] A related means to the spunbond process for forming a layer of a nonwoven fabric is the melt blown process. Again, a molten polymer is extruded under pressure through orifices in a spinneret or die. High velocity air impinges upon and entrains the filaments as they exit the die. The energy of this step is such that the formed filaments are greatly reduced in diameter and are fractured so that microfibers of finite length are produced. This differs from the spunbond process whereby the continuity of the filaments is preserved. The process to form either a single layer or a multiple-layer fabric is continuous, that is, the process steps are uninterrupted from extrusion of the filaments to form the first layer until the bonded web is wound into a roll.

[0026] The present invention also contemplates the use of sub-denier, as well as nano-denier filaments within the cleaning sheet. Nano-denier continuous filaments preferably have a denier of less than or equal to 1000 nanometers, and preferably have a denier less than or equal to about 500 nanometers.

[0027] Suitable nano-denier continuous filament layers can be formed by either direct spinning of nano-denier filaments or by formation of a multi-component filament that is divided into sub-denier filaments prior to deposition on a substrate layer. U.S. Patents No. 5,678,379 and No. 6,114,017, incorporated herein by reference, exemplify direct spinning processes practicable in support of the present invention. Multi-component filament spinning with integrated division into sub-denier filaments can be practiced in accordance with the teachings of U.S. Patents No. 5,225,018 and No. 5,783,503, incorporated herein by reference.

[0028] One or more layers of woven or nonwoven fabric may be used in combination with a film layer in formation of the cleaning sheet. Various film layers may include, cast films, extruded films, and reticulated films. Extruded films utilizing the composition of the present invention can be formed in accordance with the following representative direct extrusion film process. Blending and dosing storage comprising at least one hopper loader for thermoplastic polymer chip and, optionally, one for pelletized additive in thermoplastic carrier resin, feed into variable speed augers. The variable speed augers transfer predetermined amounts of polymer chip and additive pellet into a mixing hopper. The mixing hopper contains a mixing propeller to further the homogeneity of the

mixture. Basic volumetric systems such as that described are a minimum requirement for accurately blending the additive into the thermoplastic polymer. The polymer chip and additive pellet blend feeds into a multi-zone extruder. Upon mixing and extrusion from the multi-zone extruder, the polymer compound is conveyed via heated polymer piping through a screen changer, wherein breaker plates having different screen meshes are employed to retain solid or semi-molten polymer chips and other macroscopic debris. The mixed polymer is then fed into a melt pump, and then to a combining block. The combining block allows for multiple film layers to be extruded, the film layers being of either the same composition or fed from different systems as described above. The combining block is connected to an extrusion die, which is positioned in an overhead orientation such that molten film extrusion is deposited at a nip between a nip roll and a cast roll.

[0029] In addition, breathable films, such as monolithic and microporous films, or reticulated films, can also be used within the cleaning sheet. Monolithic films, as taught in patent number U.S. 6,191,211, and microporous films, as taught in patent number U.S. 6,264,864, both patents herein incorporated by reference, represent the mechanisms of forming such breathable barrier films. Reticulated films, such as those of patent numbers U.S. 4,381,326 and U.S. 4,329,309, are representative of macroporous films.

[0030] It is within the purview of the present invention that the cleaning sheet may be utilized in a wet or dry state. An aqueous or non-aqueous cleaning composition may be topically applied or impregnated into the cleaning sheet. Cleansing compositions suitable for such end use applications include those that are described in U.S. Patents No. 6,103,683 to Romano, et al., No. 6,340,663 to Deleo, et al., No. 5,108,642 to Aszman, et al., and No. 6,534,472 Arvanitidou, et al., all of which are hereby incorporated by reference. Selected cleaning compositions may also include surfactants, such as alkylpolysaccharides, alkyl ethoxylates, alkyl sulfonates, and mixtures thereof; organic solvent, mono- or polycarboxylic acids, odor control agents, such as cyclodextrin, peroxides, such as benzoyl peroxide, hydrogen peroxide, and mixtures thereof, thickening polymers, aqueous solvent systems, suds suppressors, perfumes or fragrances, and

detergent adjuvants, such as detergency builder, buffer, preservative, antibacterial agent, colorant, bleaching agents, chelants, enzymes, hydrotropes, and mixtures thereof. The aforementioned compositions preferably comprise from about 50% to about 500%, preferably from about 200% to about 400% by weight of the nonwoven cleaning article.

[0031] From the foregoing, numerous modifications and variations can be effected without departing from the true spirit and scope of the novel concept of the present invention. It is to be understood that no limitation with respect to the specific embodiment disclosed herein is intended or should be inferred. The disclosure is intended to cover, by the appended claims, all such modifications as fall within the scope of the claims.